Post weaning diarrhoea susceptibility in piglets in relation to supplementary creep feeding and the pro-inflammatory TNF- repronse

Carstensen, Lone; Røntved, C. M.; Jensen, K. H.; Nielsen, Jens Peter

POST WEANING DIARRHOEA SUSCEPTIBILITY IN PIGLETS IN RELATION TO SUPPLEMENTARY CREEP FEEDING AND THE PRO-INFLAMMATORY TNF-α RESPONSE

L. Carstensen[1,2*], CM. Røntved[1], KH. Jensen[1], JP. Nielsen[2]
[1] Danish Institute of Agricultural Sciences (DIAS), Department of Animal Health and Welfare, DK-8830 Tjele, Denmark.
[2] The Royal Veterinary and Agricultural University, Department of Clinical Studies, Dyrlægevej 88, DK-1870 Frederiksberg C, Denmark

troduction and Objectives

st weaning diarrhoea is a disease causing substantial onomical and animal welfare problems worldwide, ecially in the intensive pig production. The disease is used by enterotoxigenic *Escherichia coli* (ETEC) cteria. The abrupt nutritional change from milk to ep feed may contribute to the morphological and ysiological changes in the small intestinal tract at aning, thus enhancing the colonization of ingested or ident pathogenic bacteria (1, 2).

obably the disease susceptibility is also influenced by piglets' own immune responsiveness, because the ternally derived serum immunoglobulins are waning at weeks of age simultaneously with the withdrawal of the lk and its locally protective elements (3).

pplementary creep feeding during the suckling period s been suggested to reduce the risk of diarrhoea after aning by stabilizing the gut morphology and ysiology and preventing the colonization of ETEC. As ally ingested antigens are found to stimulate the local d systemic immunological development, pplementary creep feeding is furthermore hypothesised affect the immune function around weaning.

aterials and Methods

lf of the suckling piglets in 12 litters were offered ep feed from 2 weeks of age until weaning at 4 weeks age. During the suckling period, individual recordings creep feed contact were carried out by direct servations (instantaneous sampling according to hner (4)), presuming a positive relation between the d contact and feed intake. Clinical signs of ontaneous diarrhoea and faecal shedding of haemolytic *coli* were recorded during the suckling period and 5 ys after weaning. Furthermore, the piglets' sponsiveness in TNF-α was measured on days 1 and 2 fore weaning as well as days 1 and 2 after weaning, ing an ex vivo whole blood endotoxin stimulation test. ie ex vivo whole blood stimulations were performed th 0 μg or 50 μg LPS per ml sodium heparin stabilized ole blood and processed for 3 hours. A commercial zyme linked immunosorbent assay (ELISA) was used r quantification of plasma TNF-α (pig ELISA TNF-α, erce Endogen).

sults and Discussion

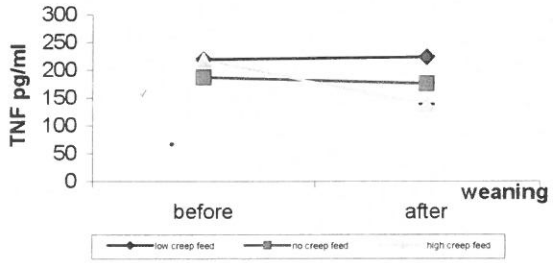
arrhoea occurred in 34% of the piglets after weaning d was associated with faecal shedding of haemolytic *E. li* bacteria, specifically *E. coli* O149 (table 1).

The occurrence of faecal shedding of haemolytic *E. coli* bacteria and spontaneous diarrhoea during the first 5 days after weaning was not influenced by whether piglets were creep fed or not. However, the creep feed contact pattern during the suckling period influenced the faecal *E. coli* O149 shedding. Piglets with a low creep feed contact (less than the median) less often shed *E. coli* O149 compared to piglets with a high creep feed contact (more than the median) and piglets not offered creep feed (table 1).

Table 1

		N (%)	Diarrhoea	*E. coli* O149
Diarrhoea	Yes	31 (34%)		15 (48%)
	No	59 (66%)		7 (12%)
Creep feeding	Yes	46 (51%)	13 (28%)	8 (17%)
	No	44 (49%)	18 (41%)	14 (32%)
Creep feed contact	None	44 (49%)	18 (41%)	14 (32%)
	Low	24 (27%)	3 (13%)	2 (8%)
	High	22 (24%)	10 (45%)	6 (27%)

Figure 1



Piglets with low creep feed contact during the suckling period furthermore had higher responsiveness in TNF-α, compared to non-creep fed piglets and piglets with high creep feed contact (figure 1).

Low faecal shedding of *E. coli* O149 and high responsiveness in TNF-α 2 days after weaning were associated with low diarrhoea occurrence. It is suggested that intestinal morphological, immunological and digestive conditions associated with a voluntary low creep feed contact during the suckling period may limit the small intestinal proliferation of *E. coli* O149. This may lead to lower susceptibility to post weaning diarrhoea.

References

1. Buddington RK1993. Can J Physiol Pharmacol. 72:251-259.
2. Nabuurs MJA. 1995. Pig Nevs and Information. 16(3)93-97.
3. Kelly D and Coutts AGP. 2000. Proceedings of the Nutrition Society. 59:177-185.
4. Lehner PN. 1996. Ethological methods.

INTERNATIONAL PIG VETERINARY SOCIETY

18TH CONGRESS

JUNE 27 – JULY 1, 2004

HAMBURG/GERMANY

PROCEEDINGS

VOL. 2